*An online exploration of Arizona's biotic communities with an emphasis on Language Arts and Social Studies*

# Exploring Arizona's Biotic Communities

## *Lesson 1: Mapping Biotic Communities*

### LESSON OVERVIEW

Students read online information and take notes using graphic organizers and reading strategies to reinforce their understanding. Students learn about biotic communities and locate them on shaded relief maps.

### SUGGESTED GRADE LEVELS

- 6 – 10

### ENDURING UNDERSTANDINGS

- Ecosystems, which are based on differences in soil, climate, and human and natural disturbances, can be defined on local or global scales.
- Arizona has a tremendous natural diversity because of the state's variety of ecosystems.
- Maps come in various types, including thematic (rainfall, population, vegetation) and topographic.
- Nonfiction authors organize information to help the reader comprehend.

### OBJECTIVES

Students will:

- Define key terms (e.g., biotic community, topography, adaptation, and others as appropriate for the grade level).
- Read, understand, and take effective notes on key concepts and terms in the selected reading.
- Recognize the main idea and supporting details.
- Locate places, elevations, and biotic communities on a map.

### ARIZONA DEPARTMENT OF EDUCATION STANDARDS

| Grade | Reading | Writing | Social Studies |
|---|---|---|---|
| 6 | S3-C1-02; S3-C1-09 | S3-C2-01; S3-C6-01 | S4-C1-01; S4-C1-03; S4-C1-05; S4-C2-02 |
| 7 | S3-C1-02; S3-C1-10 | S3-C2-01; S3-C6-01 | S4-C1-01; S4-C1-03; S4-C1-05; S4-C2-02; S4-C5-01 |
| 8 | S3-C1-02; S3-C1-10 | S3-C2-01; S3-C6-01 | S4-C1-01; S4-C1-03; S4-C1-05 |

| | | | |
|---|---|---|---|
| 9 | S3-C1-01; S3-C1-08 | | S4-C1-01; S4-C1-02; |
| 10 | S3-C1-01; S3-C1-07; S3-C1-08 | | |

*Note: The full text of these standards can be found in Appendix A.*

## TIME FRAME

- 2 days (45 minutes each day)

## MATERIALS

- Access to "Exploring Arizona's Natural Resources" (Web site or CD available from azgfd.gov/focuswild)
- World map
- *Reading Anticipation Guide* (one per student)
- *Biotic Communities Graphic Organizer* (one per student)
- *Map of Arizona: Student Version* (one per student)
- *Map of Arizona: Teacher Version* (one transparency)
- *Arizona Topography Map* (one per group)
- *Average Annual Precipitation Map* (one per group)
- *Mapping Biotic Communities Rubric* (one per group)
- Blank overhead transparency

## TEACHER PREPARATION

- Review "Exploring Arizona's Natural Resources" and select vocabulary specific to the grade level being taught.
- Be sure computers with Internet access are available.
- Prepare a paragraph describing your own "biotic community" to share with students as a model paragraph.
- Decide on groupings for student teams. Four is the recommended number in a group. It is best to use heterogeneous teams.
- Make copies of *Arizona Topography Map, Average Annual Precipitation Map* and the *Mapping Biotic Communities Rubric* for each group.
- Make copies of *Biotic Communities Graphic Organizer* and *Reading Anticipation Guide* for each student.

## SUGGESTED PROCEDURES

Session 1:

1. Survey students to see where they were born.
2. Students write a short descriptive paragraph describing that place. Include terrain type (mountainous, desert, forest, plains…), temperature, rainfall, etc. (Be flexible. If a student prefers to write about a place he feels closer to, that's okay.)
3. Discuss a few of these places. Ask students to talk about temperature, rainfall, type of terrain, urban or rural setting—any features you want to emphasize. Be sure to introduce the vocabulary words appropriate to your level. Begin to introduce the term "biotic community" as a group of plants and animals living in the same area that interact with one another.

4. Using a world map, point out the polar regions. Discuss why no one was born there. Ask them what kinds of animals might live in such cold places, and how are they able to survive? Include the term "adaptation" in your discussion. Lead the students into a discussion about what is required in a habitat for humans to live there.
5. Students now add a paragraph to their papers discussing how humans have "adapted" to living in the places they described (e.g., we have developed ways to cool our homes to make them comfortable in the desert's extreme heat).
6. Students complete Part 1 of the *Reading Anticipation Guide*.
7. When completed, allow students time to read and take notes on the "Explore Arizona" section of the Web site, stopping after the section on "Development" under "Changes Over Time." Be sure to have them pull out unfamiliar vocabulary terms and list them on a separate sheet of paper. This will be particularly useful for the next lesson.
8. Using their notes, students complete Part 2 of the *Reading Anticipation Guide*.

Session 2:

1. Students hand in the *Reading Anticipation Guide*. Ask if they were surprised by anything in their reading. Discuss.
2. Model web or spider mapping on the overhead projector by reading the "Alpine Tundra" section together (see sample web).
3. Give students the opportunity to use this technique by reading and taking notes on each of the remaining biotic communities. *Alternative: assign teams of students to different communities and ask them to present their findings to the rest of the class*.
4. Briefly discuss their observations about the various communities. How are they different? Where can they be found?
5. Distribute copies of the *Map of Arizona.* Use the overhead and the teacher version of the Arizona map to help students locate key places on their maps (e.g., Grand Canyon, Salt River, Colorado River, Yuma, Page, Sunrise Ski Area, etc.). Ask students to name places they have visited in Arizona and help them locate these on the projected map. Have them place these locations on their outline maps.
6. Divide the students into their teams, and give each team the *Arizona Topography* and *Average Annual Precipitation* maps and a scoring rubric. Clarify items on the rubric if needed.
7. Working as teams, students locate the various biotic communities on the shaded relief map and then mark the locations on their outline maps. Students must use elevation, rainfall, and other information from the Web site to make their decisions. Teams should decide on a separate color to designate each biotic community and shade in the area using that color.
8. Each student independently makes a key to the map.
9. Students turn in their Biotic Communities map.

**ASSESSMENT**

- Informal evaluation of participation in the group activity
- Biotic Communities map using the rubric provided
- *Reading Anticipation Guide*

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## EXTENSIONS

- Students may conduct a Web search to find information on the differences in the criteria used by various scientific fields to define or delineate biotic communities. For example, do plant biologists and animal biologists use the same or different criteria to designate biotic communities?

# Appendix A: Arizona Department of Education Standards – Full Text

**Reading Standards**

| Grade | Strand | Concept | Performance Objective |
|---|---|---|---|
| 6 | 3 | 1 – Expository Text | 2 – Summarize the main idea and critical details of expository text, maintaining chronological or logical order<br>9 – Draw valid conclusions about expository text, supported by text evidence |
| 7 | 3 | 1 – Expository Text | 2 – Summarize the main idea (stated or implied) and critical details of expository text, maintaining chronological order, sequential, or logical order<br>10 – Make relevant inferences about expository text, supported by text evidence |
| 8 | 3 | 1 – Expository Text | 2 – Summarize the main idea (stated or implied) and critical details of expository text, maintaining chronological order, sequential, or logical order<br>10 – Make relevant inferences about expository text, supported by text evidence |
| 9 | 3 | 1 – Expository Text | 1 – Compare (and contrast) original text to a summary for accuracy of the main ideas, inclusion of critical details, and the extent to which it conveys the underlying meaning of the original text<br>8 – Support conclusions drawn from ideas and concepts in expository text |
| 10 | 3 | 1 – Expository Text | 1 – Compare (and contrast) original text to a summary for accuracy of the main ideas, inclusion of critical details, and the extent to which it conveys the underlying meaning of the original text<br>7 – Make relevant inferences by synthesizing concepts and ideas from a single reading selection<br>8 – Support conclusions drawn from ideas and concepts in expository text |

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**Writing Standards**

| Grade | Strand | Concept | Performance Objective |
|---|---|---|---|
| 6 | 3 | 2 – Expository | 1 – Record information (e.g. observations, notes, lists, charts, map labels and legends) related to the topic |
| | | 6 – Research | 1 – Write a summary of information from sources (e.g. encyclopedias, Web sites, experts) that includes:<br>a. paraphrasing to convey ideas and details from the source<br>b. main idea(s) and relevant details |
| 7 | 3 | 2 – Expository | 1 – Record information (e.g. observations, notes, lists, charts, map labels and legends) related to the topic |
| | | 6 – Research | 1 – Write a summary of information from sources (e.g. encyclopedias, Web sites, experts) that includes:<br>c. paraphrasing to convey ideas and details from the source<br>d. main idea(s) and relevant details |
| 8 | 3 | 2 – Expository | 1 – Record information (e.g. observations, notes, lists, charts, map labels and legends) related to the topic |
| | | 6 – Research | 1 – Write a summary of information from sources (e.g. encyclopedias, Web sites, experts) that includes:<br>e. paraphrasing to convey ideas and details from the source<br>f. main idea(s) and relevant details |

**Social Studies Standards**

| Grade | Strand | Concept | Performance Objective |
|---|---|---|---|
| 6 | 4 | 1 – The World in Spatial Terms | 1 – Construct maps, charts, and graphs to display geographic information<br>3 – Interpret maps, charts, and geographic databases using geographic information<br>5 – Interpret thematic maps, charts, and databases depicting various aspects of world regions |
| | | 2 – Places and Regions | 2 – Describe the factors that cause regions and places to change |

**Social Studies Standards Continued**

| Grade | Strand | Concept | Performance Objective |
|---|---|---|---|
| 7 | 4 | 1 – The World in Spatial Terms | 1 – Construct maps, charts, and graphs to display geographic information<br>3 – Interpret maps, charts, and geographic databases using geographic information<br>5 – Interpret thematic maps, charts, and databases depicting various aspects of world regions |
| | | 2 – Places and Regions | 2 – Explain the concept of regions and why they change |
| | | 5 – Environment and Society | 1 – Identify the physical processes (e.g., conservation of natural resources, mining, water distribution in Arizona) that influence the formation and location of resources |
| 8 | 4 | 1 – The World in Spatial Terms | 1 – Construct maps, charts, and graphs to display geographic information<br>3 – Interpret maps, charts, and geographic databases using geographic information<br>5 – Interpret thematic maps, charts, and databases depicting various aspects of world regions |
| | | 1 – The World in Spatial Terms | 1 – Construct maps using appropriate elements (i.e., date, orientation, grid, scale, title, index, legend, and situation)<br>2 – Interpret maps and images (e.g., political, physical, relief, thematic, Geographic Information Systems [GIS] and Landsat) |
| High School | 4 | 2 – Places and Regions | 1 – Identify the characteristics that define a region:<br>a. physical processes (i.e., climate, terrain, resources)<br>b. human processes (i.e., religion, political organization, economy, demographics) |
| | | 3 – Physical Systems | 1 – Analyze how weather and climate influence the natural character of a place (e.g., the effect of heat transfer, Earth's rotation, and severe weather systems) |

## Appendix B: Worksheets and Overheads

The pages that follow contain the worksheets listed below:

A. *World Map* – If a map is not available in the classroom, use the following world map as an overhead or student handout. (1 page)

B. *Reading Anticipation Guide* – Worksheet for students to fill out as they read the material presented on the "Exploring Arizona's Natural Resources" Web page (2 pages)

C. *Graphic Organizer Sample – Alpine Tundra* – Guide your students through a sample web by using this as a key or an overhead. (1 page)

D. *Biotic Communities Graphic Organizer* – One version of a web that your students can use as they study the biotic communities (1 page)

E. *Map of Arizona: Student Version* – A blank map that the students can use to map the biotic communities (1 page)

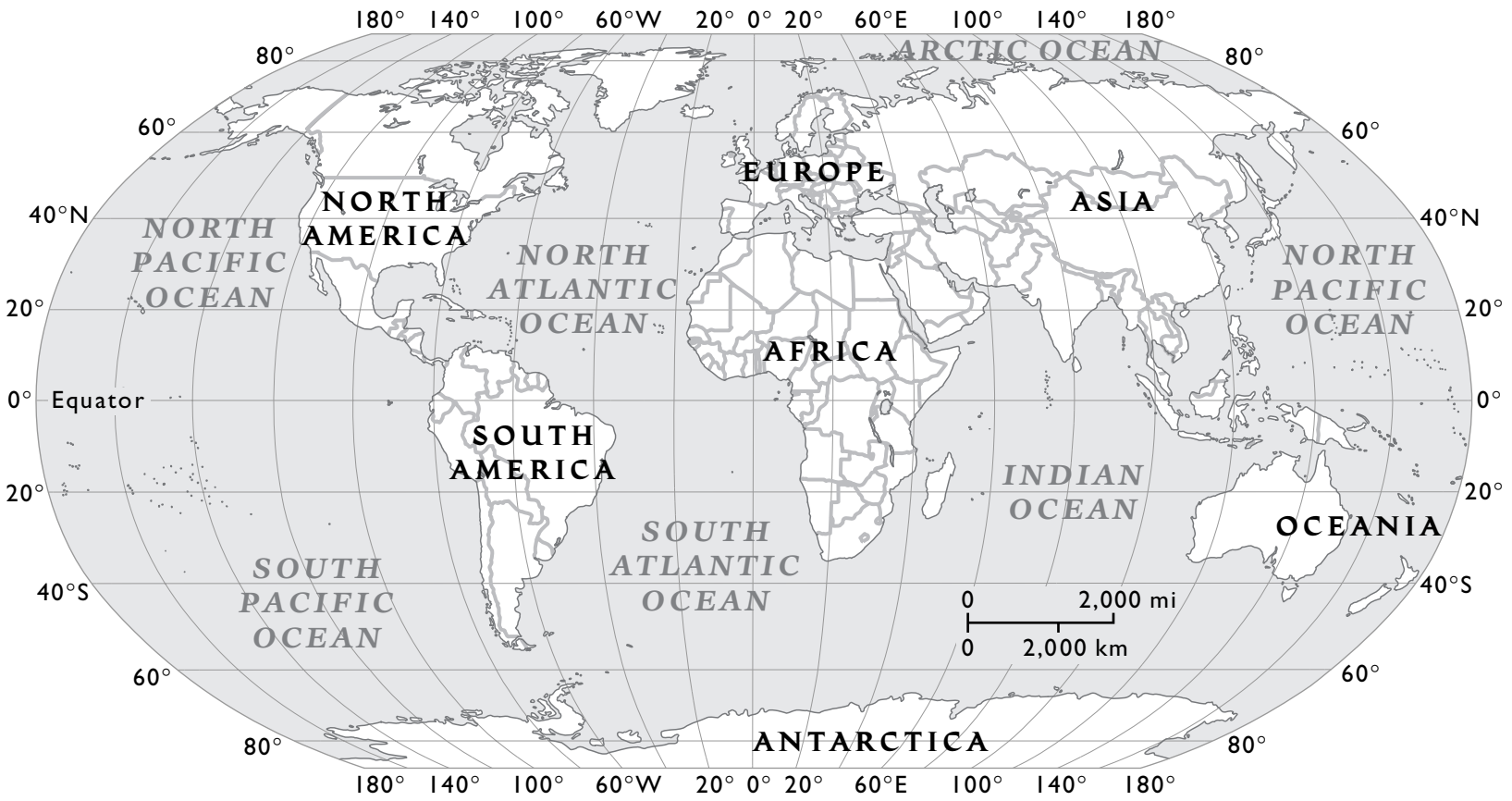
F. *Map of Arizona: Teacher Version* – The same map provided to students but with important locations labeled (1 page)

G. *Arizona Topography Map* – A shaded relief map showing elevations throughout the state (1 page)

H. *Average Annual Precipitation Map* – A map showing the average precipitation that areas of Arizona receive each year (1 page)

I. *Mapping Biotic Communities Rubric* – One possible method for assessing the student-generated maps (1 page)

# THE WORLD



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XPEDITIONS
www.nationalgeographic.com/xpeditions

*Exploring Arizona's Biotic Communities*

# Reading Anticipation Guide

## Explore Arizona

**PART 1:**
Before you read the Web assignment, read each statement in Part 1. If you believe that the statement is true, place a check in the *Agree* column. If you believe that the statement is false, place a check in the *Disagree* column. Be ready to explain your choices.

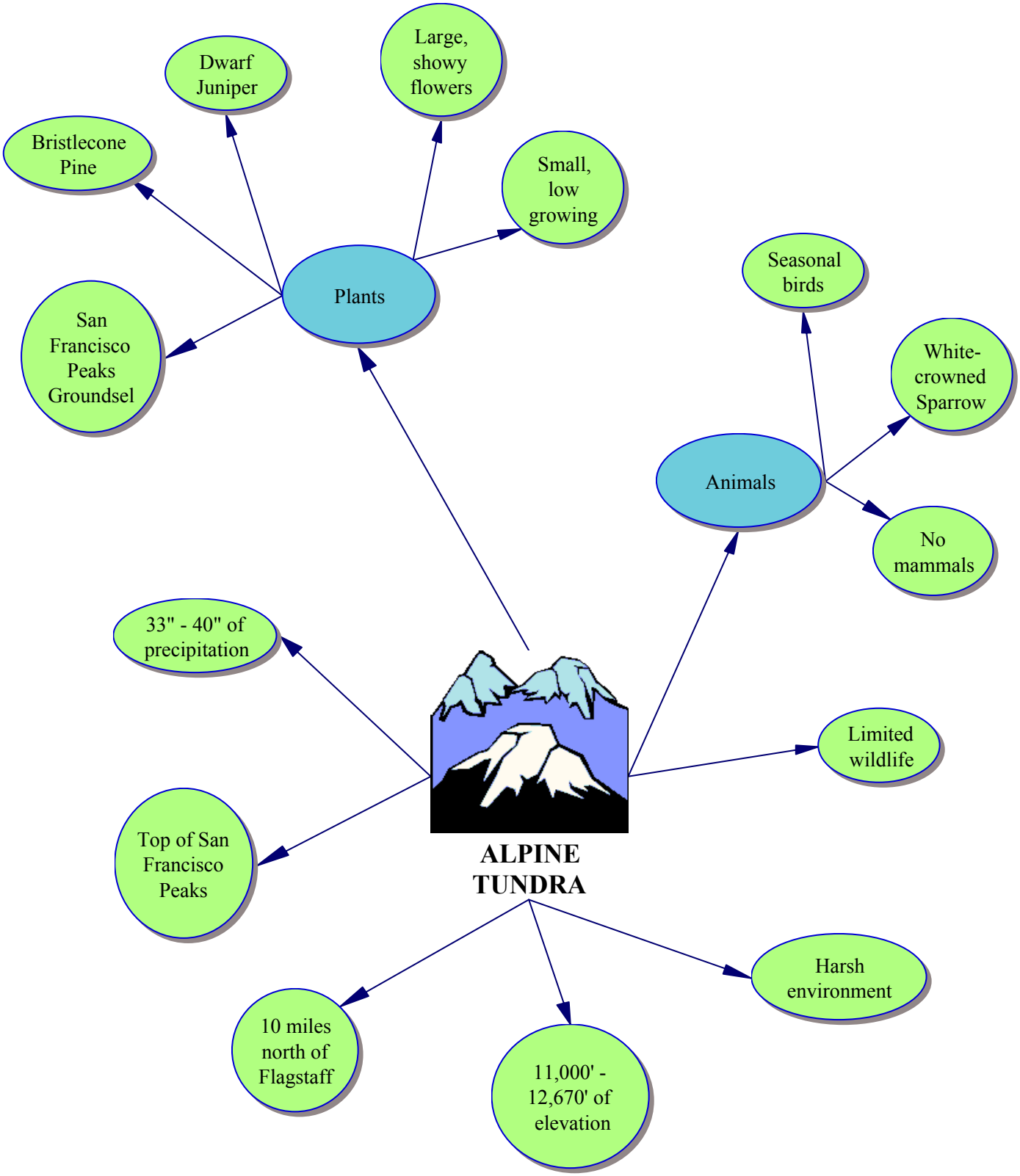
| Agree | Disagree | |
|---|---|---|
| ☐ | ☐ | 1. Arizona is mostly desert. |
| ☐ | ☐ | 2. Plants and animals living in one area may not be found in other areas. |
| ☐ | ☐ | 3. Elevation and latitude are important factors in determining temperature. |
| ☐ | ☐ | 4. Arizona receives limited moisture. |
| ☐ | ☐ | 5. The rain shadow effect means that one storm is closely followed by another less severe storm. |
| ☐ | ☐ | 6. Arizona's topography ranges from 137 feet above sea level to more than 12,000 feet. |
| ☐ | ☐ | 7. Some of Arizona's most rugged terrain is found in the northern half of the state. |
| ☐ | ☐ | 8. Plants thriving in a particular biotic community have an upper limit, the altitude where it is too wet or too cold to grow, but not a lower limit. |
| ☐ | ☐ | 9. Southwest facing slopes and mountainsides tend to be drier because they are closer to the equator. |
| ☐ | ☐ | 10. Most of the changes to Arizona's landscape and native plant and wildlife populations have occurred as a result of natural events. |

Now read the section titled "Explore Arizona" from the Web site. Take notes, using the statements above as a guide. In addition, write down any **vocabulary** that is new or used in an unfamiliar way.

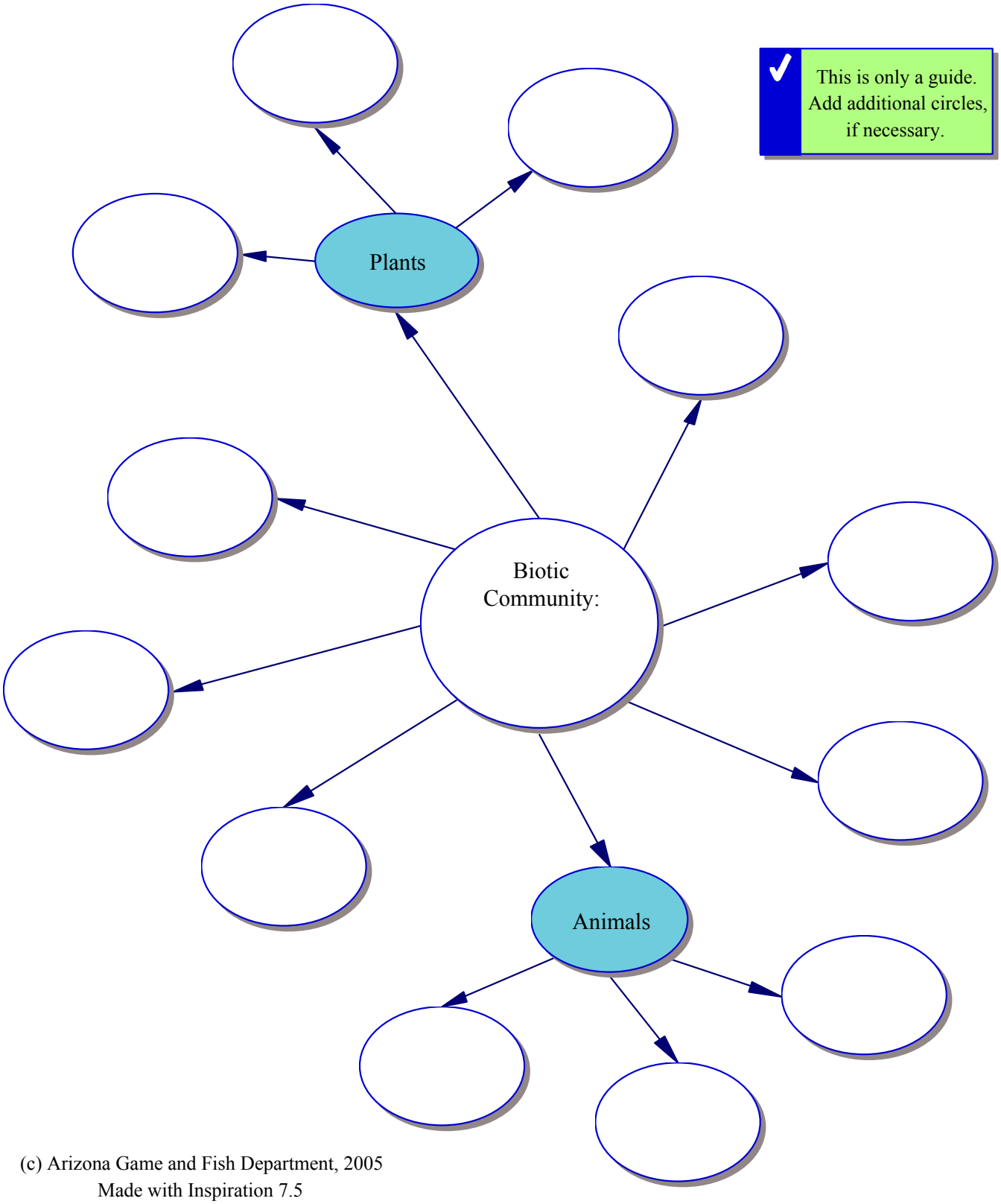
**PART 2:**
After you have finished reading, use your notes to review statements 1–10. If the information you read supports your choice, place a check in the *Yes* column in Part 2. Then write what the text says in your own words in the column under "*Why my choice is correct:"* If the information does NOT support your choice, place a check in the *No* column. Then write what the text says in your own words in the column under "*Why my choice is incorrect:"*

| ***Statement*** | ***Does the text supports my choice?*** | | ***Why my choice is correct:*** | ***Why my choice is incorrect:*** |
|---|---|---|---|---|
| | ***Yes*** | ***No*** | | |
| ***1*** | | | | |
| ***2*** | | | | |
| ***3*** | | | | |
| ***4*** | | | | |
| ***5*** | | | | |
| ***6*** | | | | |
| ***7*** | | | | |
| ***8*** | | | | |
| ***9*** | | | | |
| ***10*** | | | | |

# GRAPHIC ORGANIZER SAMPLE - ALPINE TUNDRA



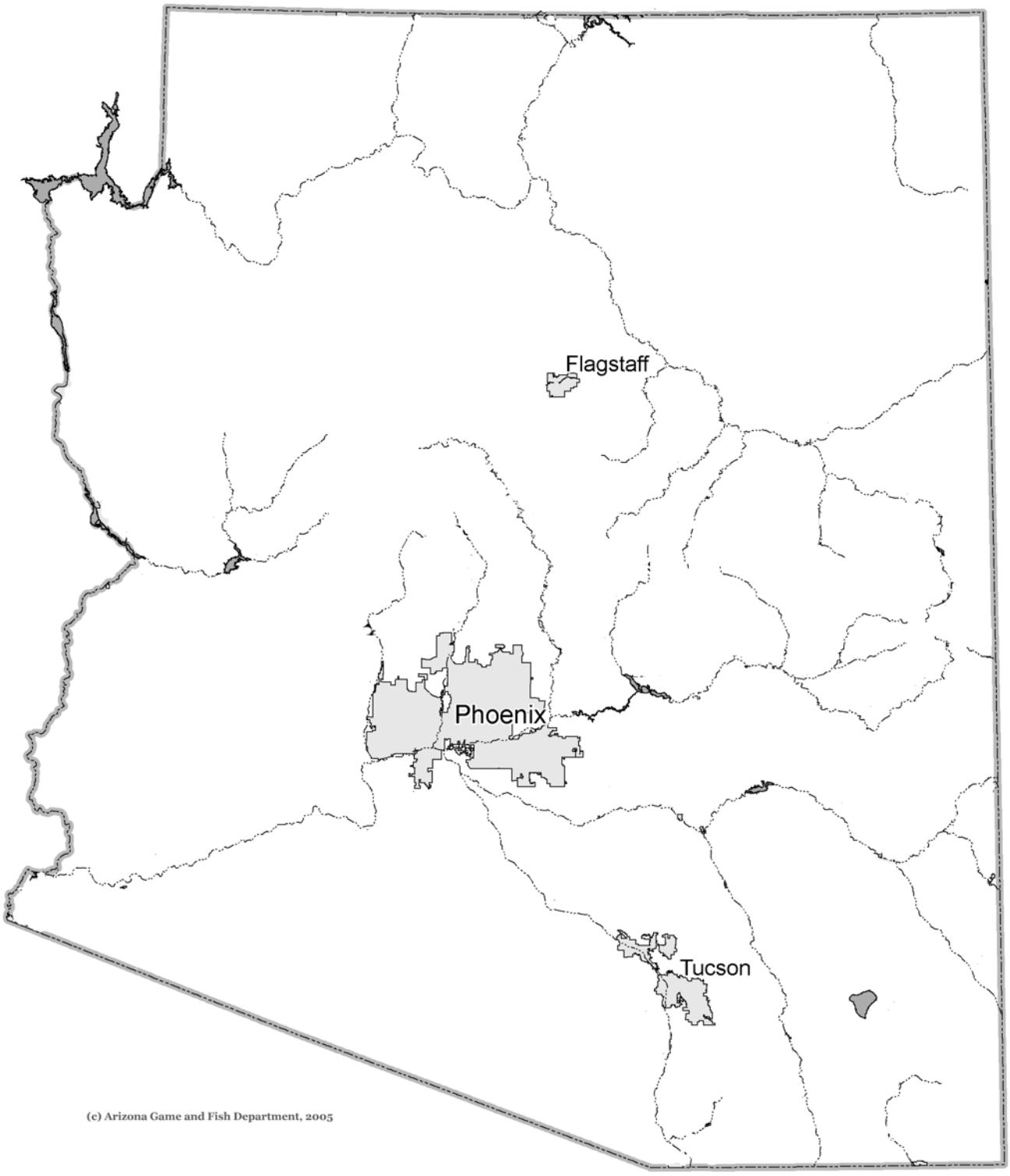
# BIOTIC COMMUNITIES GRAPHIC ORGANIZER



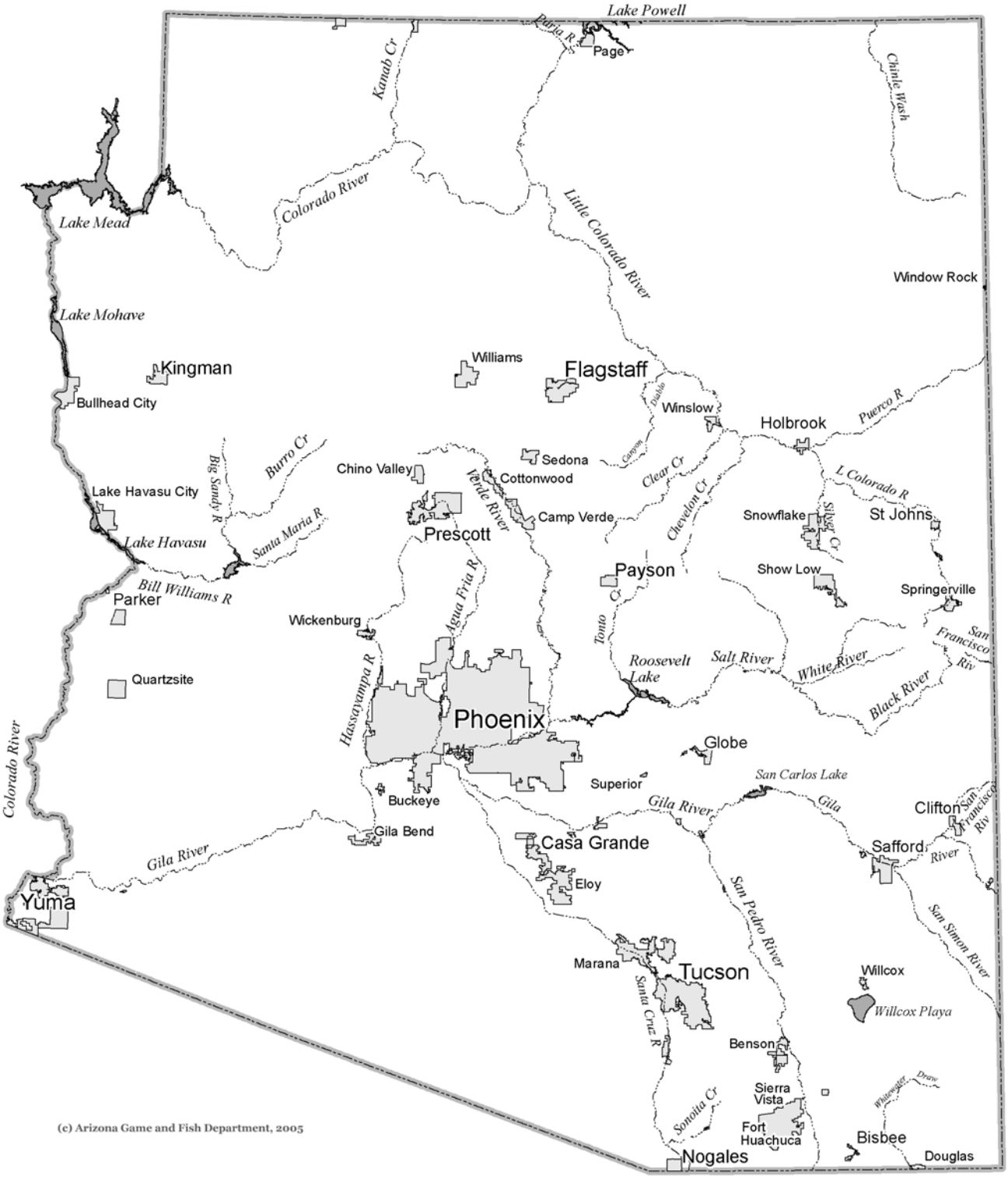


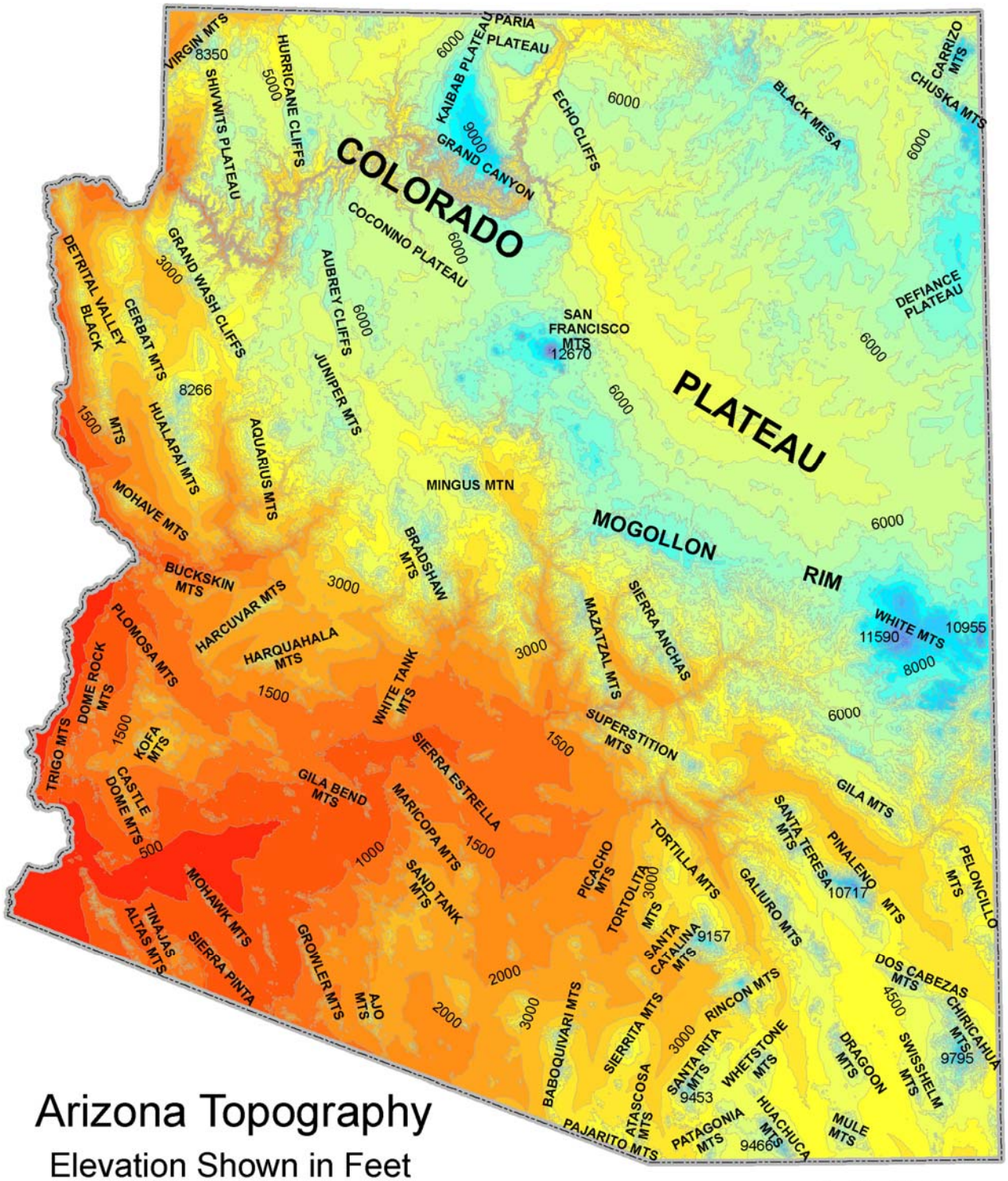
Made with Inspiration 7.5

# Map of Arizona: Student Version



# Map of Arizona: Teacher Version

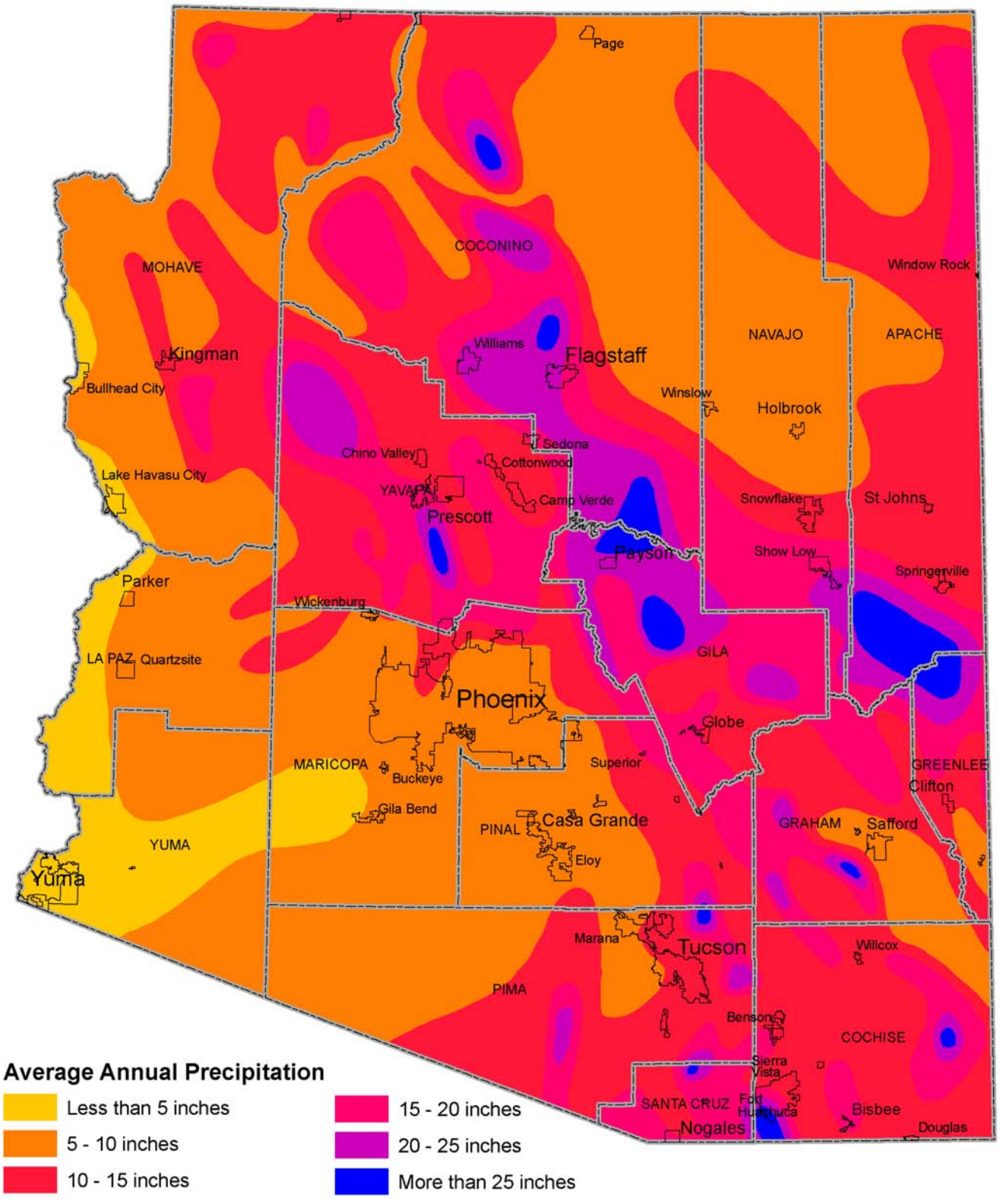





# Arizona Topography

## Elevation Shown in Feet

0 - 500
500 - 1000
1000 - 1500
1500 - 2000
2000 - 2500
2500 - 3000
3000 - 3500
3500 - 4000
4000 - 4500
4500 - 5000
5000 - 5500
5500 - 6000
6000 - 6500
6500 7000
7000 - 7500
7500 - 8000
8000 - 8500
8500 - 9000
9000 - 9500
9500 - 10000
10000 - 10500
10500 - 11000
11000 - 11500
11500 - 12000
12000 PLUS


Page
COCONINO
MOHAVE
Window Rock
NAVAJO
APACHE
Kingman
Williams
Flagstaff
Bullhead City
Winslow
Holbrook
Sedona
Chino Valley
Cottonwood
Lake Havasu City
YAVAPAI
Camp Verde
Snowflake
St Johns
Prescott
Payson
Show Low
Springerville
Parker
Wickenburg
LA PAZ
Quartzsite
GILA
Phoenix
Globe
MARICOPA
Buckeye
Superior
GREENLEE
Clifton
Gila Bend
PINAL
Casa Grande
GRAHAM
Safford
YUMA
Eloy
Yuma
Marana
Tucson
Willcox
PIMA
Benson
COCHISE
Sierra Vista
SANTA CRUZ
Fort Huachuca
Bisbee
Nogales
Douglas
Average Annual Precipitation
Less than 5 inches
5 - 10 inches
10 - 15 inches
15 - 20 inches
20 - 25 inches
More than 25 inches

# Mapping Biotic Communities Rubric

Use the following rubric to assist as you create your map of the biotic communities in Arizona.

| CATEGORY | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| **Labels - Accuracy** | Items are labeled and located correctly. | Most items are labeled and located correctly. | Some items are labeled and located correctly. | Many items are labeled and located incorrectly. |
| **Labels and Features - Neatness** | Labels/ features can be read easily and are neatly done. | Most labels/ features can be read easily and are neatly done. | Labels/ features may be difficult to read and/or are messy. | Labels/ features are difficult to read and/or are messy. |
| **Map Legend/Key** | Legend is easy-to-find and contains a complete set of symbols, including a compass rose. | Legend contains a complete set of symbols, including a compass rose. | Legend contains an almost complete set of symbols, including a compass rose. | Legend is absent or lacks several symbols. |
| **Spelling/ Capitalization** | Words on the map are spelled and capitalized correctly. | There are few spelling or capitalization errors. | Many words are misspelled and/or are capitalized incorrectly. | Most words are misspelled and/or are capitalized incorrectly. |